



C3 common spaces and conference rooms are designed to provide a convenient and comfortable environment for collaboration.

Collaborative Computing Center (C3)

Enabling research and education through computational science, high-performance computing, and scientific visualization.

Scientific computing is an integral component of the science and technology priorities at Idaho National Laboratory. High-performance computing resources (supercomputers) enable scientific computing and visualization. Their use in INL research has expanded across diverse disciplines and driven innovation in clean energy research.

That is why, in partnership with the state of Idaho, the 67,000-square-foot Collaborative Computing Center (C3) was established and constructed.

COLLABORATIVE SPACES

C3 contains 15 office spaces referred to as pods, where multidisciplinary, multi-institutional teams work in

a neighborhood-like setting. Outside these office pods are common areas designed to provide a more casual location for teams to connect and brainstorm. The halls are lined with dry-erase boards, and small-team collaborative spaces exist throughout the facility, including a 1,600-square-foot conference room for large meetings and events.

C3 has the capacity to host 196 resident staff members, and individuals and teams regularly cycle through based on current projects and interdisciplinary needs. C3 representatives conduct frequent tours, hosting hundreds of visitors annually. In fiscal year 2022, over 700 people toured the facility.

ACADEMIC PARTNERSHIPS

Since 2009, INL has been highly engaged in computing partnerships with Idaho universities, particularly the University of Idaho, Boise State University and Idaho State University. C3 continues to strengthen and expand these partnerships by providing unprecedented access to computing technology and technical expertise.

Off-site computer users, such as students and faculty at Idaho's universities and colleges, have remote access to the C3 facility through the Idaho Regional Optical Network. Idaho universities working with the Center for Advanced Energy Studies manage two university supercomputers in the C3 facility including the 1.0 petaflop system named Falcon.



Idaho's university students are granted access to INL supercomputers, drastically improving their research and computer modeling capabilities.



COMPUTING RESOURCES – THE HPC DATA CENTER

C3 is distinctly geared toward people and relationships, but the showpiece of the facility is the data center, which hosts supercomputing resources that are an essential component of the facility. The data center houses five supercomputers and has the capacity to house anywhere from one to 10 more, depending on the size of the machine.

Each supercomputer requires enough electricity to power hundreds of homes. Should the main power source fail, C3 is equipped with a power system that can't be interrupted and a generator that can keep servers operational.

Hardware of this scale demands an efficient and robust cooling system. Water is pumped from large cooling towers through a series of pipes, sent through the server room floor, and distributed through small copper tubes inside the supercomputer cabinets. The warm water is then returned through the

floor to heat exchangers where it is cooled and processed before returning to the data center.

Although the hardware and infrastructure of the data center is notable, the high-performance computing capabilities and output are even more impressive. Thousands of users access C3 supercomputers each day, and the machines provide the advanced computing power necessary to address some of the nation's most complex and challenging problems using modeling and simulation techniques.

SCIENTIFIC VISUALIZATION

Research teams in several adjacent visualization laboratories use specialized software and hardware to develop 3D interactive and immersive environments. These environments support research, engineering and prototype design, training, digital twin development, education, and scientific visualization. Their mission is to enable science through visualization,

primarily in 3D immersive environments, 3D models and animations, or other graphical or visual displays.

Their capabilities have informed a range of energy related projects, such as:

- Illustrating atomic-scale physics concepts in nuclear reactors.
- Enabling engineers to conduct time and motion studies on their computer-aided designs for a new mobile hot cell and to observe conflicts in their models (at full scale) that allow them to make functional improvements before construction.
- Allowing reactor operators to experience and test new control room layouts and touch points in immersive environments.
- Training INL maintenance staff members with desktop 3D applications.

Battelle Energy Alliance manages INL for the U.S. Department of Energy's Office of Nuclear Energy.

FOR MORE INFORMATION

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